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CONFIGURATION FOR SEPARATING CAVITIES

Cross-Reference to Related Application:

This application is a continuation of copending International Application No. PCT/DE98/03680, filed December 15, 1998, which designated the United States.

Background of the Invention:

Field of the Invention:

The invention relates to a configuration for separating cavities, in particular in a chassis or a body of a motor vehicle for sealing or sounding, including a retaining device positioned in a relevant cross-sectional region of a cavity for a shaped element made of expansible material.

In a known configuration for moisture sealing and sound insulation in cavities, a single-piece retaining device which is positioned in a relevant cross-sectional region is made of plastic and includes two lateral boundary walls that are connected to one another by inner connecting webs or ribs and have a peripheral contour corresponding approximately to that of the cavity cross section which is to be sealed. A correspondingly shaped element made of expansible material and having the size of the interspace remaining between the two

boundary walls of the single-piece retaining device, is introduced into that retaining device. With the supply of heat, e.g. during coating of the body of motor vehicles, the expansible shaped element expands, with the result that the material emerges from the remaining opening between the two boundary walls of the retaining device and thus undergoes fixed connection to an adjacent inner wall of the cavity. That achieves a watertight or sound-insulating separation of the relevant cavity.

However, that process is disadvantageous insofar as the production of the single-piece retaining devices is very costly, due to high mold costs. Furthermore, the introduction of the shaped elements made of expansible material into the retaining device requires a high outlay in terms of installation and time. Although it is only necessary to seal a border region between the inner wall of the cavity and the retaining device, use is made essentially of a full-surface-area expansible shaped element, that is to say one which corresponds approximately to the entire cross section of the cavity. However, that shaped element can only expand in the direction of the cavity at the border and can only expand in the direction of the boundary walls in the central region, if at all. That renders the consumption of expansible material high.

Summary of the Invention:

It is accordingly an object of the invention to provide a configuration for separating cavities, which overcomes the hereinafore-mentioned disadvantages of the heretofore-known devices of this general type, which is intended for separating off cavities in a sealing and sound-insulating manner and which can be produced cost-effectively with low production and material outlay.

With the foregoing and other objects in view there is provided, in accordance with the invention, a configuration for separating cavities for sealing or sound-proofing, in particular in the chassis or the body of motor vehicles, comprising an expansible shaped element constructed as a contoured ring-like plate; and a retaining device to be positioned in a cross-sectional region of a cavity for receiving the shaped element, the retaining device having two separately produced half-shells to be latched to one another at a distance from one another; one of the half-shells having an inner contour; the half-shells forming an outer peripheral border region therebetween in a latched state; and the half-shells defining a free gap therebetween being open toward the border region, bounded inwardly by the inner contour and by the expansible shaped element and having a shape corresponding substantially to the shaped element.

First of all, such a securing device can be produced easily and cost-effectively using uncomplicated injection molds. In addition, the straightforward mold structure allows changes in contour to be carried out quickly and easily. A further advantage is in the straightforward installation of the shaped elements made of expansible material in the retaining device, wherein it is possible for the installation operation to be automated. Finally, using the invention achieves a reduction in the amount of expansible material being used, in which it is possible for this reduction to be more than 50%. The reduction in the amount of material being used is achieved according to the invention in that the expansible material, which is constructed as a ring-like plate with an outer contour corresponding to the cross section of the cavity that is to be sealed, is only provided wherever it is actually required for sealing purposes and, with a predetermined flow direction, can also expand without obstruction in the direction of the hollow-body wall which is to be sealed, while the material flow to the center of the half-shell is bounded by the inner contour provided on one half-shell.

In accordance with another feature of the invention, the half-shells have inner surfaces, and latching devices are disposed on the inner surfaces for connecting the half-shells.

In accordance with a further feature of the invention, one of the latching devices is a mushroom-shaped latching element to be arrested in an opening formed in an inner wall of a cavity to be sealed.

In accordance with an added feature of the invention, the shaped element has material-free spaces in the vicinity of the latching devices.

In accordance with an additional feature of the invention, the two half-shells are first and second half-shells, the first half-shell has the inner contour, the second half-shell has a region corresponding to the inner contour, and the latching devices are disposed in the vicinity of the inner contour and the region of the second half-shell.

In accordance with yet another feature of the invention, the two half-shells are first and second half-shells, one of the latching devices is a latching cylinder disposed on the first half-shell and another of the latching devices is a mushroom-shaped latching element integrally formed on the second half-shell and on which the latching cylinder is to be latched.

In accordance with yet a further feature of the invention, the latching devices are integrally formed on an outer surface or

on an outer border of one of the half-shells for connection to an inner wall of a cavity to be separated off.

In accordance with yet an added feature of the invention, the half-shells are formed of injection molded plastic.

In accordance with a concomitant feature of the invention, the expansible shaped element is formed of a material expanding under the influence of heat toward an open side of the peripheral gap formed between the half-shells.

Other features which are considered as characteristic for the invention are set forth in the appended claims.

Although the invention is illustrated and described herein as embodied in a configuration for separating cavities, it is nevertheless not intended to be limited to the details shown, since various modifications and structural changes may be made therein without departing from the spirit of the invention and within the scope and range of equivalents of the claims.

The construction and method of operation of the invention, however, together with additional objects and advantages thereof will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings.

Brief Description of the Drawings:

Fig. 1 is a diagrammatic, plan view of an inner surface of a first half-shell;

Fig. 2 is a plan view of an expansible shaped element;

Fig. 3 is a plan view of an outer surface of a second half-shell; and

Fig. 4 is a fragmentary, sectional view of a retaining device made up of two half-shells, with a shaped element being introduced, in a region of a latching element of the half-shells, for the purpose of fastening on a hollow-body wall.

Description of the Preferred Embodiments:

Referring now to the figures of the drawings in detail, it is seen that a retaining device includes two separate retaining shells which are produced in separate injection-molding operations and can thus be produced by using straightforward molds, with a low outlay in terms of time and therefore at reduced cost. A first half-shell 1 shown in Fig. 1 has a central region with an inner contour 2 as well as two integrally formed latching cylinders 3 having a height which corresponds to that of an expansible shaped element 8 shown in Fig. 2. A latching opening 4 is located in the elevated inner

contour 2. A narrow border region 5 remains between a peripheral edge of the inner contour and a peripheral outer edge of the half-shell 1.

The expansible shaped element 8 according to Fig. 2 has material-free spaces 6, 7 with contours that are respectively slightly larger than that of the inner contour 2 and of a circumference of a latching cylinder 3 of the half-shell 1.

An outer contour of a second half-shell 9 corresponds to that of the first half-shell 1 and that of the expansible shaped element 8. The second half-shell 9 has the same construction on an outer surface which is visible in this case, and has a latching web 10 and two mushroom-shaped latching elements 11 (indicated by dashed lines in Fig. 3) on an inner surface.

Fig. 4 is a sectional view of two half-shells 1, 9 which are latched to one another and have the expansible shaped element 8 located on the inside, in the region of a mushroom-shaped latching element 11 and of a latching cylinder 3. Fig. 4 illustrates, by way of example, how the first half-shell 1 is retained on the second half-shell 9 by a latching connection to the latching cylinder 3. The mushroom-shaped latching element 11, in this case, is simultaneously arrested in an opening 13 in an inner wall 12 of a cavity. In this case, the two half-shells 1, 9 are disposed approximately parallel to

the inner wall 12 of the cavity. If the retaining device is positioned perpendicularly to the inner wall 12, the mushroom-shaped latching elements 11 are located on outer edges of one of the two half-shells 1 or 9 and extend in a direction from a wall surface thereof.

The configuration for separating, or separating off, cavities for the purposes of sealing and sound insulation, functions as is described below. The two half-shells 1, 9 which are illustrated, for example, in Figs. 1 and 2, are produced by injection molding corresponding to the cross section which is to be sealed, for example a cavity of a body of a motor vehicle. The corresponding shaped elements, which form essentially a contoured ring-like plate having the outer contour of the cross section which is to be sealed, are cut to size from expansible material.

In an automated process, the three plates, namely the two half-shells 1, 9 and the shaped element 8, are laid one upon the other, latched to one another and, in this form, are positioned in the relevant cavity. During subsequent heating, the expansible shaped element 8, which fills merely a border region between the two half-shells 1, 9, expands in a predetermined direction, namely in an open gap between the two half-shells, in the direction of the adjacent inner wall 12. Expansion in the inward direction is prevented by the

integrally formed inner contour 2 and expansion in the transverse direction is prevented by virtue of the fact that material is not provided there.